

### ABSTRACT

A method is provided for synthesizing an arbitrary waveform that approximates a specific waveform. The method includes specifying respective frequencies of component waveforms to be used to generate the arbitrary waveform, the frequencies being less than the  
5 maximum frequency needed to synthesize the specific waveform. The method further includes performing a least squares optimization of respective amplitudes and phases of the component waveforms across at least one predetermined time interval. The component waveforms having the amplitudes and phases optimized by the least squares optimization are then summed to produce the arbitrary waveform.